

**REMARKS**

Applicants respectfully request reconsideration and allowance of all pending claims.

**I. Status of the Claims**

Upon entry of this Amendment, claims 1, 2, 4, 7, 8, 12-16, 19, 24, 27, 29-31, 38, 41, 42, 45-47, 49, 51, 52, 56, 59, 64 and 164 are currently pending. Claims 1 and 46 have been amended to more specifically claim certain embodiments of the present disclosure. Specifically, claims 1 and 46 have been amended to require the extender to be different and separate from the primary active material. Support for these amendments can be found, for example, in paragraph [0064] of the published application (US 2008/0038634 A1). No claims have been canceled herein and no new matter has been added by these amendments.

**II. 35 U.S.C. 102(e)/103(a) Rejections**

Reconsideration is requested of the rejection under 35 U.S.C. 102(e), or, in the alternative, § 103 (a) of claims 1, 2, 4, 7, 8, 12-16, 19, 24, 27, 29-31, 38, 41, 42, 46, 47, 49, 51, 52, 56, 59, 64 and 164 as being anticipated by, or, in the alternative, as obvious over Yamaki, et al. (U.S. 2004/0202933 A1).

**A. The Claimed Subject Matter**

The present application discloses an electrochemical cell directed toward improving the discharge efficiency of batteries

and designed for better cathode utilization without increasing the potential for significant cell gassing (see paragraphs [0009]-[00010] of the specification). More particularly, claim 1 is directed to, in relevant part (emphasis added):

an electrochemical cell that comprises:

a container defining a positive cell terminal end and a negative cell terminal end;

a cathode disposed in the container and including a primary active material;

an extender **different and separate** from the primary active material and present in an amount no greater than that of the primary active material, wherein the extender has a discharge voltage lower than an initial discharge voltage of the primary active material;

an anode including an anode material disposed in the container adjacent the cathode; and

at least one separator disposed between the anode and cathode, and further disposed between the anode and extender.

#### **B. Yamaki, et al.**

Yamaki, et al. disclose a lithium secondary battery that uses a cathode active material comprising a composite oxide of lithium and a transition metal such as Mn, Co or Ni for a cathode, a lithium intercalating anode active material mainly comprising carbon, and a non-aqueous electrolyte having lithium ions for electrochemically bonding the cathode and anode.

**C. The Claimed Subject Matter is Not  
Anticipated By or Obvious In View of Yamaki,  
et al.**

Significantly, Yamaki, et al. fail to disclose or suggest an extender **different and separate from the primary active material**. Rather, Yamaki, et al. disclose a single cathode active material that can comprise manganese and copper. On page 5 of the instant Office action, the Examiner agrees with Applicants' interpretation of Yamaki but does not find Applicants' arguments persuasive because of the former claim language. That is, the Examiner notes that further amending the claims to define the structures of the extender and the primary active material to be distinct would place Applicants' arguments in line with the claim language. In response thereto, Applicants have amended claim 1 to require the extender to be different and separate from the primary active material. Accordingly, the claim is understood to require that the two materials (extender and primary active material) are present as distinct entities (i.e., present as a physical mixture, present in separate layers or present in different locations within the cell). In contrast, the cathode active materials disclosed by Yamaki, et al., such as, for example,  $\text{LiMn}_{0.7}\text{Cu}_{0.2}\text{Al}_{0.1}\text{O}_2$ , are not distinct, but, rather, they exist as a single phase material, which is different from Applicants' materials. That is, the disclosure in Yamaki, et al. does not contain a primary active material and a **separate** extender material.

As such, Yamaki, et al. **fail to disclose or suggest** an electrochemical cell that contains **each and every element** of

Applicants' claim 1. Accordingly, claim 1 is novel over the Yamaki, et al. reference.

Applicants further submit that there is no motivation to modify the secondary battery of Yamaki, et al. in order to arrive at the electrochemical cell of Applicants' claim 1.

In order for the Office to show a *prima facie* case of obviousness, M.P.E.P. § 2142 requires a clear articulation of the reasons why the claimed invention would have been obvious. Specifically, to reject a claim based on this rationale, the Office must articulate the following: (1) a finding that there was some teaching, suggestion, or motivation, either in the reference itself or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings to arrive at each and every limitation of the claimed invention; (2) a finding that there was reasonable expectation of success; and (3) whatever additional findings based on the Graham factual inquiries may be necessary, in view of the facts of the case under consideration, to explain a conclusion of obviousness. Applicants respectfully submit the Office has failed to establish a *prima facie* case of obviousness because each and every element of the claims has not been disclosed or suggested by the cited reference, and/or because there is no motivation to modify the reference in order to achieve the claimed subject matter.

Specifically, as noted above, Yamaki, et al. fail to disclose or suggest an electrochemical cell having an extender different and separate from the primary active material. As such, Yamaki, et al. fail to disclose or suggest each and every element of Applicants' claim 1, as is required for a *prima facie* case of obviousness.

Moreover, there is no reason to modify the secondary lithium battery of Yamaki, et al. in order to arrive at the electrochemical cell of Applicants' claim 1. Specifically, Applicants submit that such motivation to modify Yamaki, et al. is lacking because Yamaki, et al. **do not even comment** on a cathode having a primary active material and an extender **different and separate from** the primary active material. Rather, the Yamaki, et al. reference discloses a cathode active material that is a single material. This is a significant difference, as in Applicants' claim 1, the ability of the extender to have a discharge voltage lower than an initial discharge voltage of the primary active material is due in part to the fact that they are separate entities. In Yamaki, et al., however, there are different metal elements incorporated within the single material composite oxide that may contribute differently to the discharge of the composite oxide, but the composite oxide will still discharge as a single material. Significantly, however, these elements **are not** separate and distinct materials, such as is required in Applicants' claim 1. Thus, because the single material in Yamaki, et al. includes elements that may contribute differently to the discharge of the composite oxide, but the composite oxide still discharges as a single material, there is no reason or motivation for one having ordinary skill in the art to modify Yamaki, et al. to have a cathode including a primary active material and an extender different and separate from the primary active material. In view thereof, one of ordinary skill in the art would not be motivated to modify the secondary lithium battery of Yamaki, et al. to arrive at the specific electrochemical cell of Applicants' claim 1.

Again, the Office appears to agree with the Applicants in this regard as, on page 5 of the current Office action, as noted above, the Office agrees that Yamaki teaches a single particle active material that is different from Applicants' invention.

In view of the foregoing, Applicants respectfully submit that the Office has failed to meet its burden in establishing a *prima facie* case of obviousness here because each and every element of claim 1 has not been disclosed or suggested by the cited reference and there is no motivation to modify the cited reference in order to achieve the claimed subject matter. Accordingly, reconsideration of the rejection of claim 1 is respectfully requested.

Claims 2, 4, 7, 8, 12-16, 19, 24, 27, 29-31, 38, 41 and 42 depend from claim 1 and are thus patentable over the Yamaki, et al. reference for the same reasons set forth above with respect to claim 1, as well as for the additional elements they require.

Claim 46 is similar to claim 1 and is thus patentable over the Yamaki, et al. reference for the same reasons set forth above with respect to claim 1, as well as for the additional elements it requires.

Claims 47, 49, 51, 52, 56, 59 and 64 depend from claim 46 and are thus patentable over the Yamaki, et al. reference for the same reasons set forth above with respect to claim 46, as well as for the additional elements they require.

Claim 164 is similar to claim 1 and further requires an anode having a capacity of at least 0.5 Ah per cubic centimeter of cell internal volume. Yamaki, et al. fail to disclose or suggest an anode having the claimed capacity required in claim 164. Rather, Yamaki, et al. disclose various capacities of the single cathode active material, which **is not** a disclosure or suggestion of the cell internal volume capacity of an anode. As

such, the Yamaki, et al. reference fails to disclose each and every element of Applicants' claim 164. Further, there is no reason or motivation to modify Yamaki, et al. to include an anode having a capacity of at least 0.5 Ah per cubic centimeter of cell internal volume because Yamaki, et al. **never even comment** on an anode capacity, let alone a cell internal volume. Accordingly, claim 164 is patentable over the Yamaki, et al. reference.

Applicants note the Office's comments on pages 5-6 of the current Office action regarding the anode capacity. In response thereto, Applicants note that the measurement disclosed in claim 164 is known in the art and that one having ordinary skill in the art would readily ascertain this measurement when reading the claim, particularly in light of the specification. Specifically, as disclosed in paragraph [0054] of the specification, as known to one having ordinary skill in the art, volumetric energy density can be defined as capacity per unit mass with units of, for example, Ah/cc. As further defined in paragraph [0058] of the specification, commercial alkaline cells are restricted to an anode capacity/internal cell volume that is lesser than Applicants' claimed range.

Thus, as Applicants are claiming a known measurement in the art, and, further, the cited reference fails to even comment on said measurement, claim 164 is patentable over the cited reference.

### **III. 35 U.S.C. 103(a) Rejections**

Reconsideration is requested of the rejection under 35 U.S.C. § 103(a) of claim 45 as being unpatentable over Yamaki, et al. in view of Nanjundaswamy, et al. (U.S. 2003/0211392).

**The Claimed Subject Matter Is Not Obvious Over Yamaki, et al. in View of Nanjundaswamy, et al.**

Claim 45 depends directly from claim 1, which is discussed above. In the interests of brevity, the details and comments set forth above with respect to claim 1, as well as Yamaki, et al., will not be repeated here.

As noted above, Yamaki, et al. fail to disclose or suggest each and every element of Applicants' claim 1. Further, as Yamaki, et al. have a completely different cathode material, there is no reason or motivation to modify Yamaki, et al. in order to arrive at the specific electrochemical cell of Applicants' claim 1.

Nanjundaswamy, et al. disclose a primary lithium cell having an anode comprising lithium and a cathode comprising electrochemically active material selected from silver copper oxides having the formula  $\text{AgCuO}_2$  or  $\text{Ag}_2\text{Cu}_2\text{O}_3$ . The cathode can further include manganese dioxide in admixture with the silver copper oxides.

Significantly, however, the combination of cited references fails to disclose or suggest an extender different and separate from the primary active material, wherein the extender has a discharge voltage lower than an initial discharge voltage of the primary active material. In fact, as noted in Applicants' previous responses, Nanjundaswamy, et al. actually disclose an extender having a discharge voltage **higher than** that of the primary active material. As such, one having ordinary skill in the art would not be motivated to look to combine Yamaki, et al. with Nanjundaswamy, et al. in order arrive at the specific electrochemical cell of Applicants' claim 1.



Accordingly, claim 45, which depends from claim 1, is patentable over the combination of cited references.

**CONCLUSION**

In view of the foregoing, Applicants request favorable reconsideration and allowance of all pending claims. The Commissioner is hereby authorized to charge any fees in connection with this Amendment to Deposit Account Number 01-2384 in the name of ARMSTRONG TEASDALE LLP.

Respectfully submitted,

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